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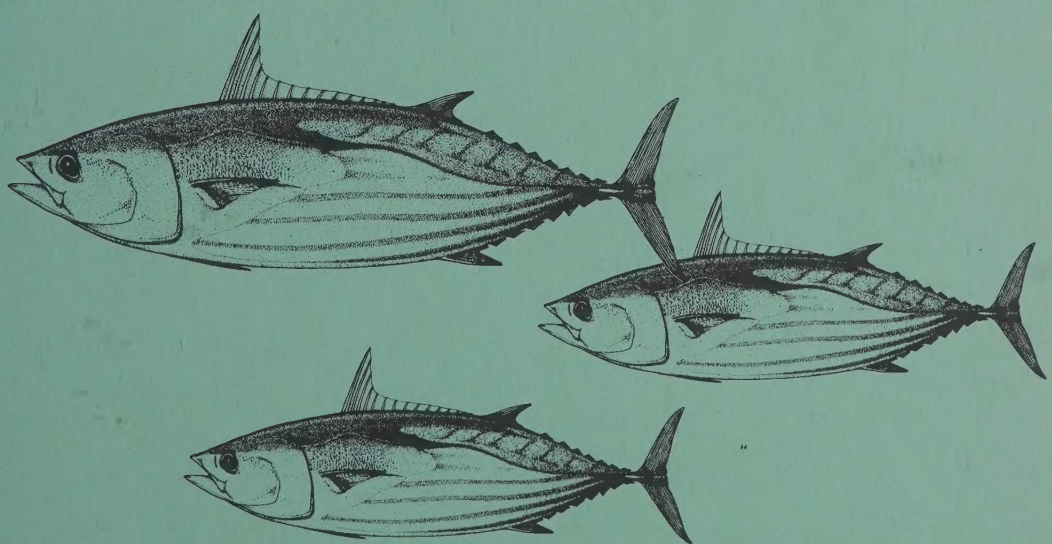

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MAY 1979, No. 5

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PREFACE

This publication, Fishing Infomation, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

To cancel delivery of this publication in the event you no longer need to receive it, or to change the delivery address if you are moving but still need to receive it, please notify us by writing: James A. Renner, Editor, Fishing Information, National Marine Fisheries Service, Southwest Fisheries Center, P.O. Box 271, La Jolla, California 92038.

Submitted for publication - May 25, 1979

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15 day supplement)

TECHNICAL EDITOR:
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L. Collins at Kains Island Light; M. V. Stewart at
Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Californian* of the Matson Navigation Co. The data are processed under supervision of D. R. McLain at the NMFS Pacific Environmental Group, Monterey, California, using computer facilities of the Fleet Numerical Weather Central, Monterey. The project is partially supported by the National Science Foundation and the Office of Naval Research.

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During May the Aleutian low pressure center is normally located near 55°N, 165°W and the subtropical high pressure center is near 35°N, 140°W (Figure 1). From 40°N to 50°N, deep fast-moving low pressure systems usually move across the north Pacific along the periphery of the Aleutian low and support a rough ocean surface and deep mixed layer. Along the east and southeast boundary of the subtropical high pressure system, surface winds are normally greater than 15 knots and southward transport of colder water takes place in the California Current from the northeast Pacific to the southern California and Baja coastal regions. Extensive low cloud cover along the west coast, combined with strong winds, help maintain relatively cold coastal waters while inland areas heat up to summertime temperatures.

During May 1979 the Aleutian low center was near its normal position, but central pressures were about 8 millibars below normal. The subtropical high pressure center was also near its normal position with central pressures 1 to 2 millibars below normal. In the central north Pacific, along the U.S. west coast, Baja California and along the southern boundary of the high, surface winds averaged 2 to 4 knots above normal.

Sea surface temperatures (SST) during May were near normal over most of the north Pacific east of 150°W except near 50°N, 145°W and 25°N, 136°W where they were more than 1°C above normal. The positive SST departures south of the Gulf of Alaska represented the only remaining influence of the late winter-spring high pressure ridge and weak wind pattern that prevailed over the northeast Pacific (Figure 5). The northward bulging isotherms along 145°W, north of 40°N, and southward spreading isotherms south of 40°N and along the U.S. west coast (Figure 3), reflected the dominating effect of the subtropical high pressure system. Most of the month the storm tracks crossed the central Pacific north of 40°N and entered the North American coast north of 50°N because of the blocking effect of the subtropical high pressure system over the northeast Pacific. As a result of above normal northward transport of relatively warm surface air and water ahead of weather fronts between 135°W and 150°W, north of 35°N, SST's remained above normal even though deep storms with very high winds frequently crossed the area (Figure 5). SST's were more than 1°C greater in May 1979 than in May 1978 over the eastern north Pacific (Figure 7) where southerly flow on the west side of the high pressure system was more pronounced in May 1979. West of 160°W, SST's remained more than 1°C below normal where seasonal warming usually occurs and was caused by the heavy wind mixing of frequent storms which intensified along the southern periphery of the Aleutian low. In this part of the north Pacific most of the surface air and sea transport was from the northwest. As a result, the north Pacific ocean front was better defined in May than in April 1979 from 38°N to 42°N, west of 150°W. The large area of SST's more than 1°C below normal southwest of Hawaii was associated with surface and upper air weather systems that frequently penetrated the subtropical area with heavy cloud cover, rain and above normal wind mixing of the ocean surface.

Western North Pacific

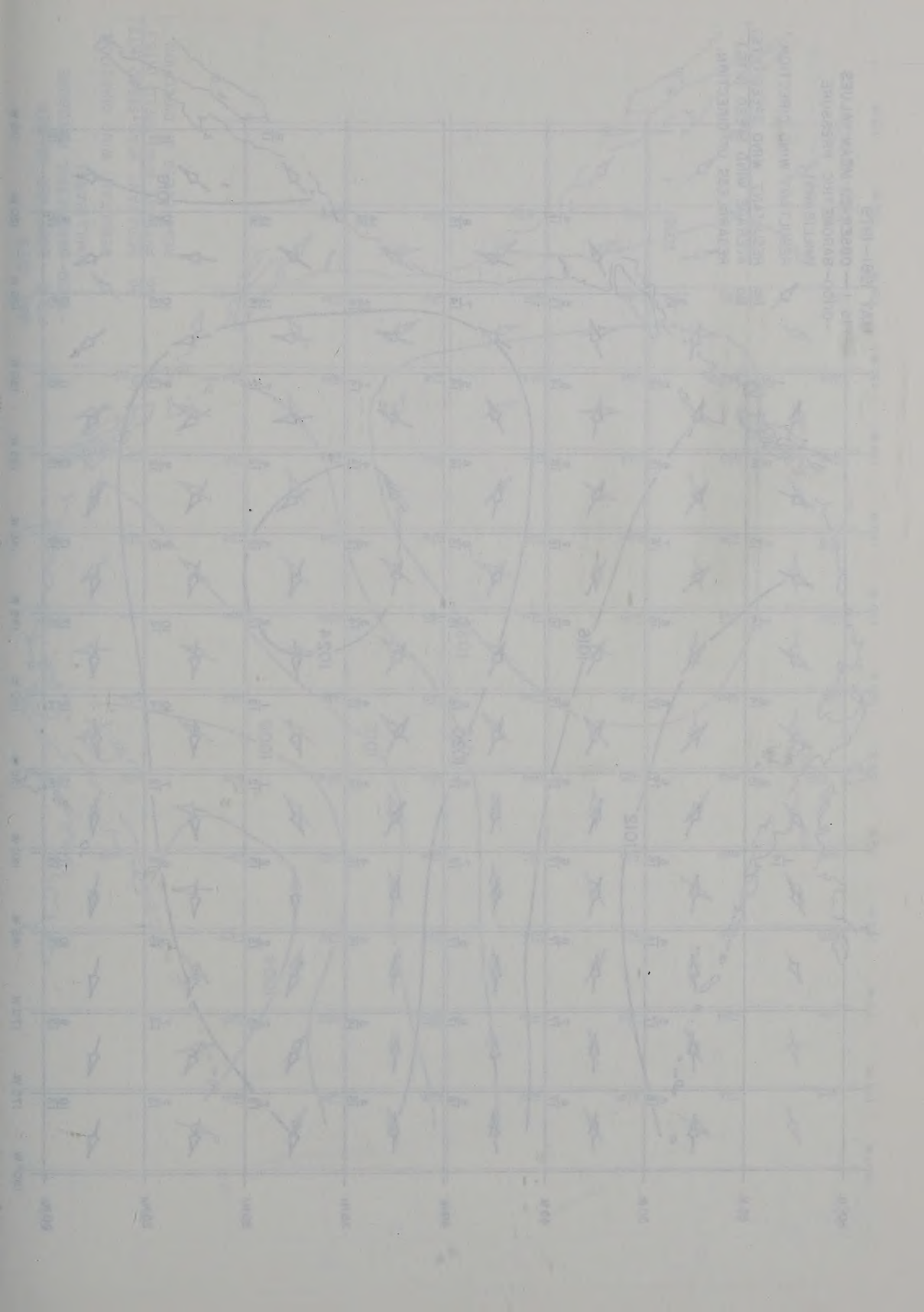
During May the Aleutian low pressure system moved eastward and did not influence the atmospheric and surface ocean circulations north of 40°N as strongly as in April 1979. The western Pacific high pressure system extended along 30°N with above normal surface pressures south of 30°N. In May the pressure pattern over the western Pacific was near normal. As a result, the north Pacific ocean front (strong north-south SST gradient) was not as sharply defined near 40°N (Figure 4), as in the previous three months when the Aleutian low pressure system dominated the north Pacific. However, a large east-west region of negative SST departures more than 1°C below normal persisted along the northern boundary of the ocean front.

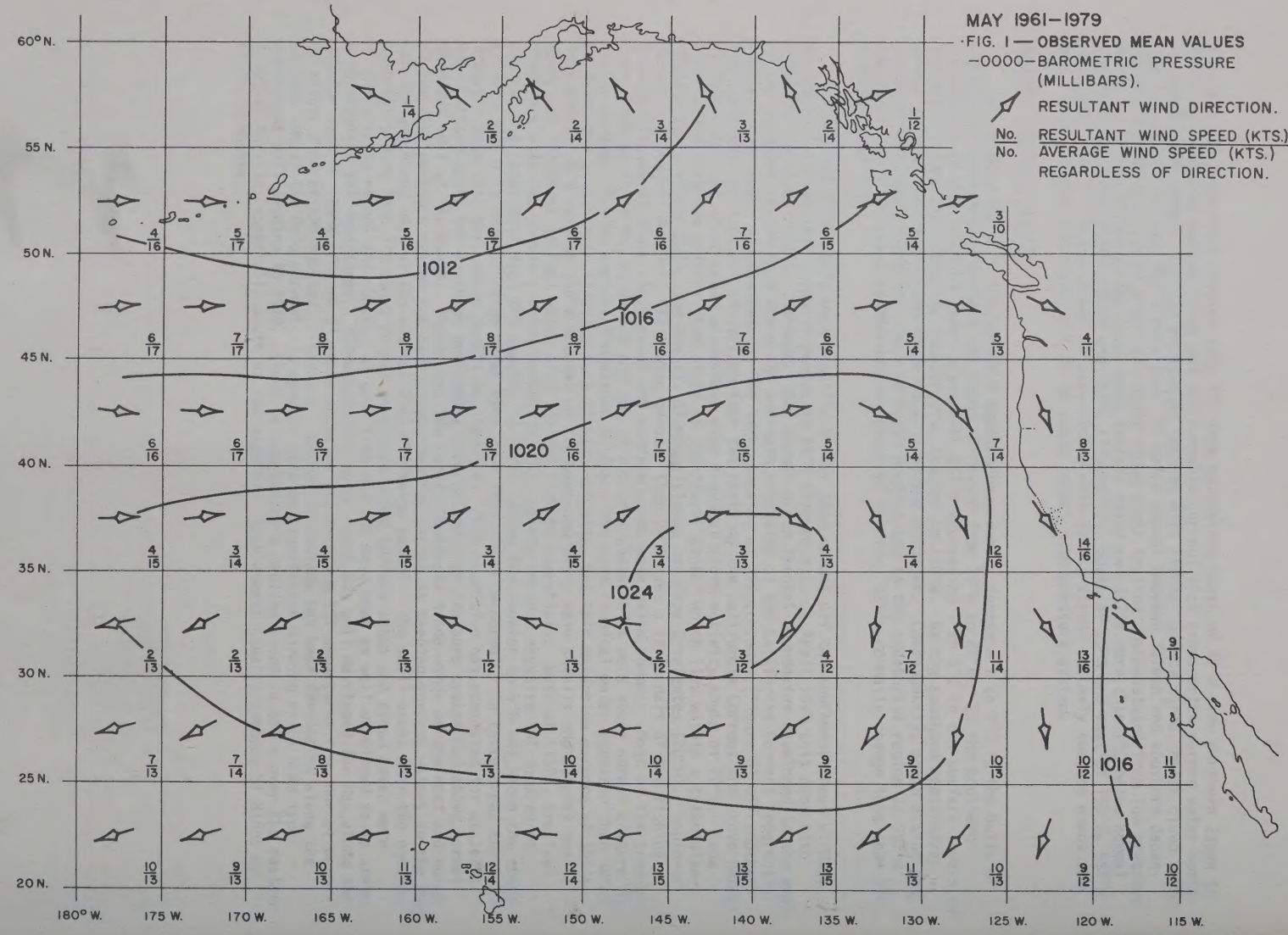
Positive SST departures greater than 1°C were maintained south of 40°N from northern Japan to 160°E by southerly surface winds and the Kuroshio Current that transported warmer water northeastward along Japan. Springtime weather systems with strong surface winds, heavy cloud cover and rain helped to keep SST's more than 1°C below normal between Taiwan and southern Japan. Weather fronts with strong winds and heavy cloud cover trailed southwestward from low pressure centers north of 40°N and kept the ocean surface mixed and SST's more than 1°C below normal from 25°N to 35°N between 140°E and 165°E (Figure 6). South of 20°N and east of 150°E, SST's were more than 1°C below normal in association with fairly strong easterly surface winds and ocean mixing along the south side of an above normal high pressure system.

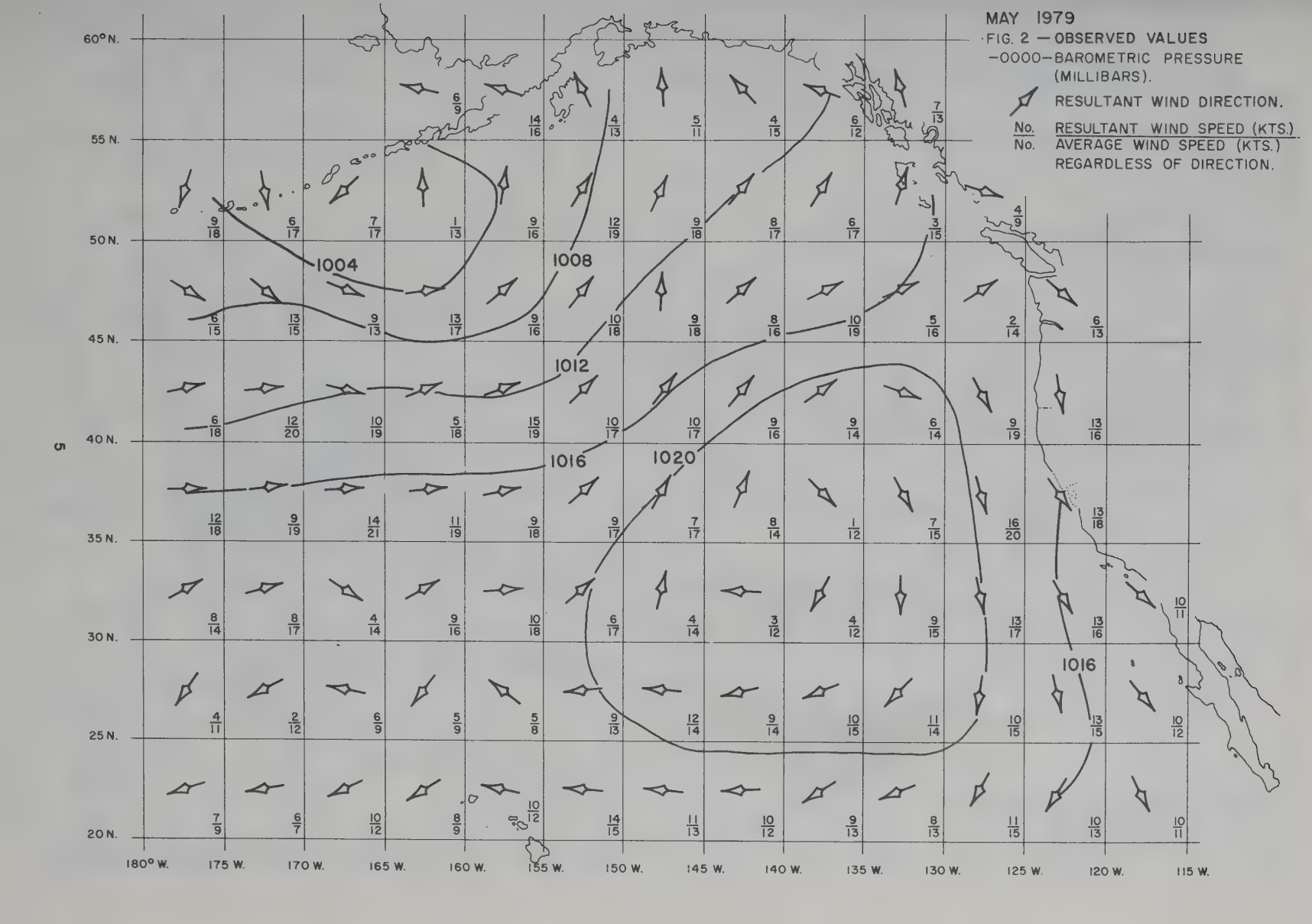
Eastern Tropical Pacific

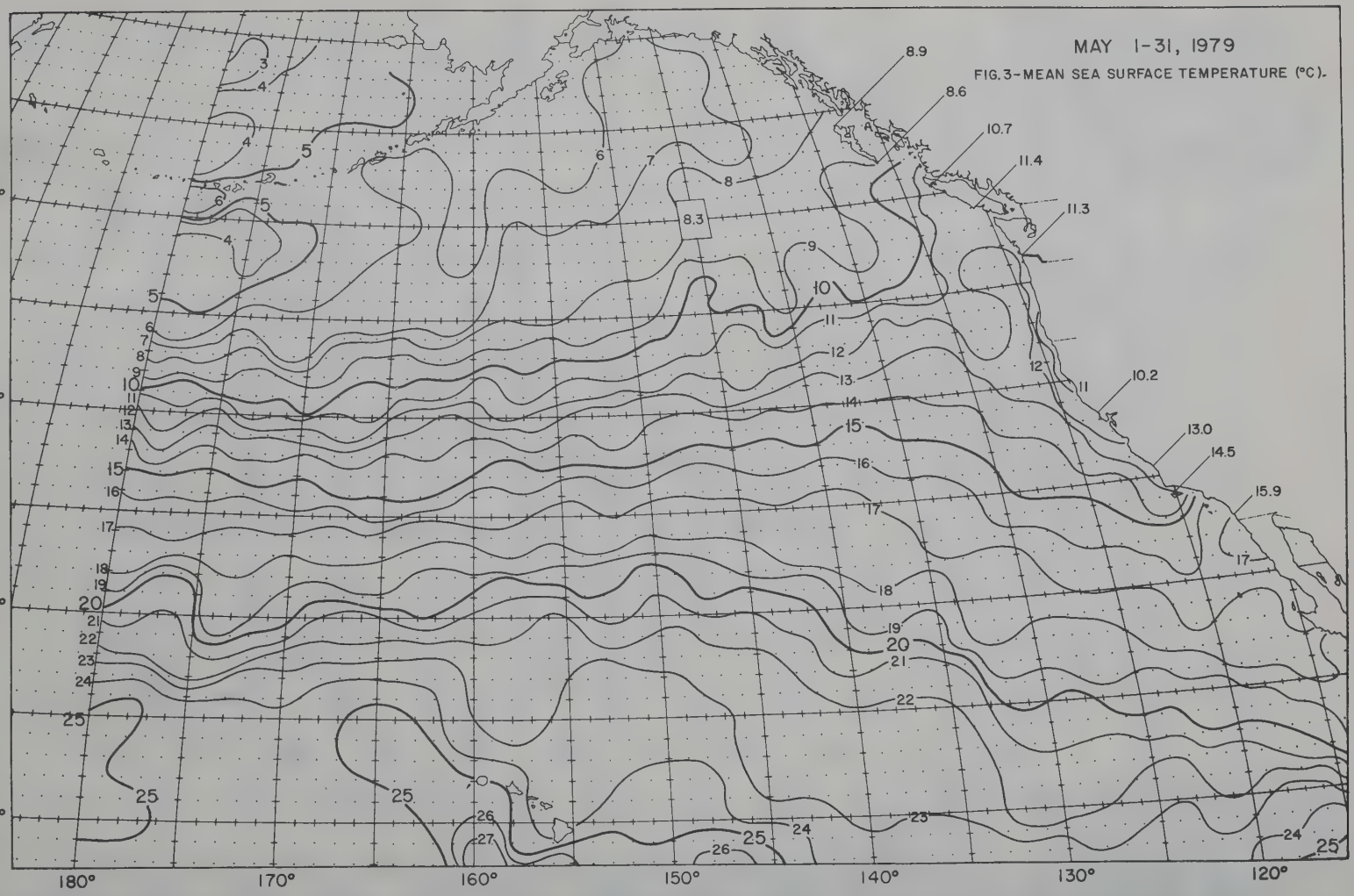
During May, SST's in the northern hemisphere normally increase 1 to 2°C in the Gulfs of California and Panama and along the coast of Mexico from 15°N to 25°N. In the southern hemisphere seasonal cooling takes place with SST's decreasing 1 to 3°C in the surface layers of the Peru Current and along the equator from Ecuador to 110°W. As the southern hemisphere winter begins, southeast trade winds usually become stronger. Consequently, ocean mixing and upwelling increase along the coast of South America and in the equatorial region as SST's decrease. In other parts of the eastern tropical Pacific, SST's normally change less than 1°C from April to May.

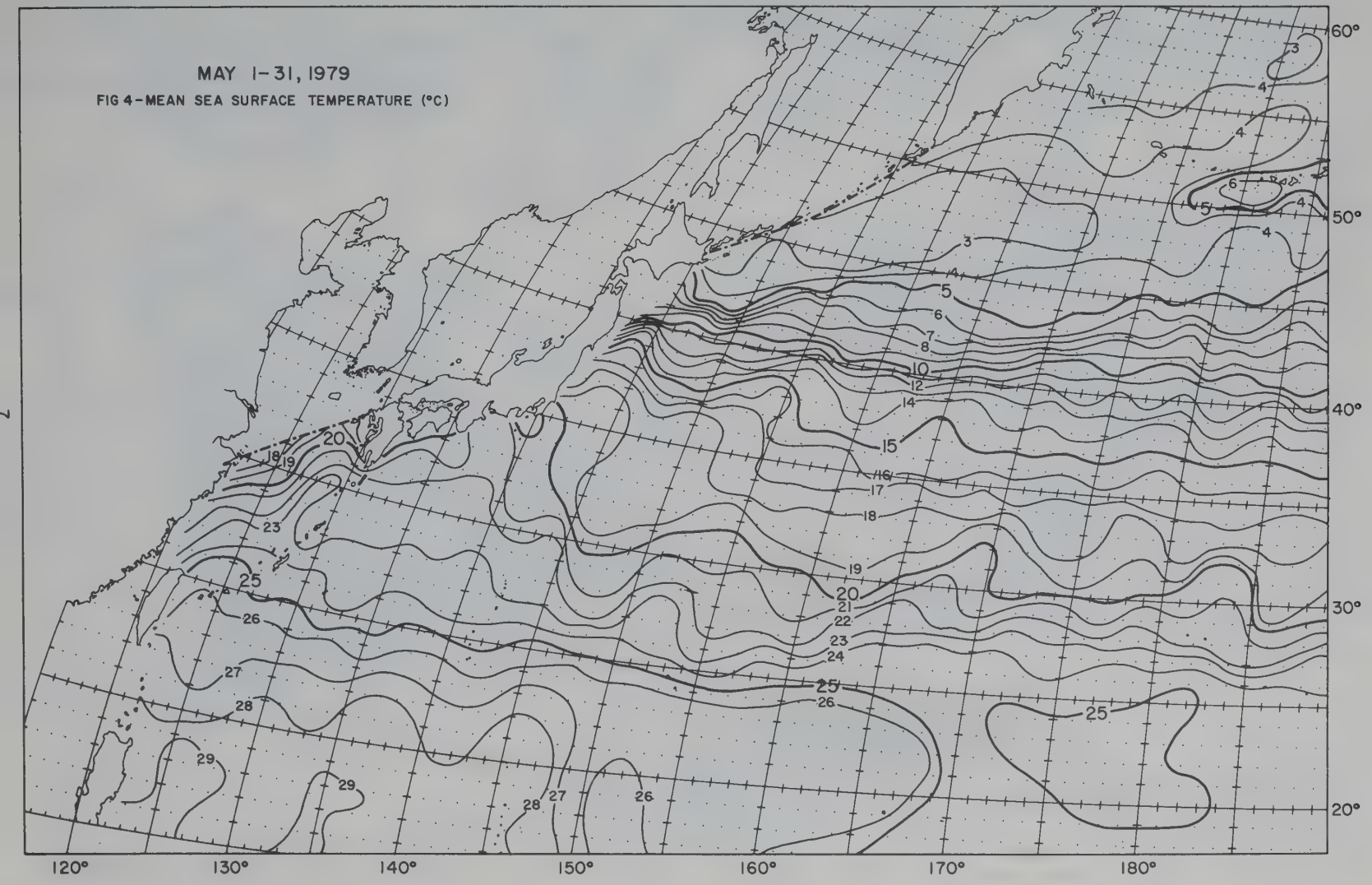
During May 1979, SST's were 1 to 2°C colder than normal off the southwest coast of Baja California and the west coast of Mexico to 15°N (Figure 9). In April 1979 this area also showed below normal SST's. Stronger than normal ocean frontal boundaries developed to the west of the southern tip of Baja where the southern extension of the California Current apparently pushed cooler water southeastward. The tight packing of SST contours (Figure 8) off southern Baja developed as a result of cooling from the north by the California Current and above normal surface winds and cloud cover associated with tropical storm activity south of 20°N. Tuna fishing activity was greater than usual on the "local banks" which lies within a triangular region from southern Baja, the Revilla Gidedos Islands and Cape Corrientes (20°N). South of Mexico and Central America, SST's were greater than 29°C over a large part of the fishing grounds (Figure 8) where cloud cover and surface winds were below normal. Most of the tropical tuna fleet moved to the northwest and out of the area where SST's were above normal (Figure 9), partly because fishing success diminished in May. The warm tropical water (greater than 30°C) may have been a factor in limiting tuna fishing activity, but this extensive warming of SST's from 8°N to 15°N east of 110°W brought on frequent and heavy rain squalls and several small chubascos (tropical storms) which also limited fishing operations. West of 115°W, tropical storm activity was probably below normal for May, partly because negative SST departures covered the large area from the equator to 15°N. Along the equator to 5°S and along the coast of Peru, SST's in several large areas were more than 1°C below normal. In these areas the tropical esterlies were above normal in strength. This condition has persisted for at least two months because the southern hemisphere subtropical high pressure system had above normal pressure most of the month. Therefore, the steady southeast trade winds on the east and north of the high pressure system has been a contributing factor in keeping surface waters in the Peru Current and along most of the equator 1 to 2°C below normal. The small areas near the equator with SST's more than 1°C above normal developed where surface winds and cloud cover were slightly below normal and equatorial upwelling may not have been as well developed as in areas with negative SST departures. The equatorial ocean front was well developed for May along the equator east of 110°W (Figure 8) where negative and positive SST departures from normal were on either side of the equator. Because extensive cooling has been developing along the equator and in the Peru Current, it appears that no significant warming or El Niño type conditions will develop in 1979. There is apparently a cooling trend in SST's over the eastern tropical Pacific, especially south of the equator. Such events usually precede El Niños by 12 to 18 months.

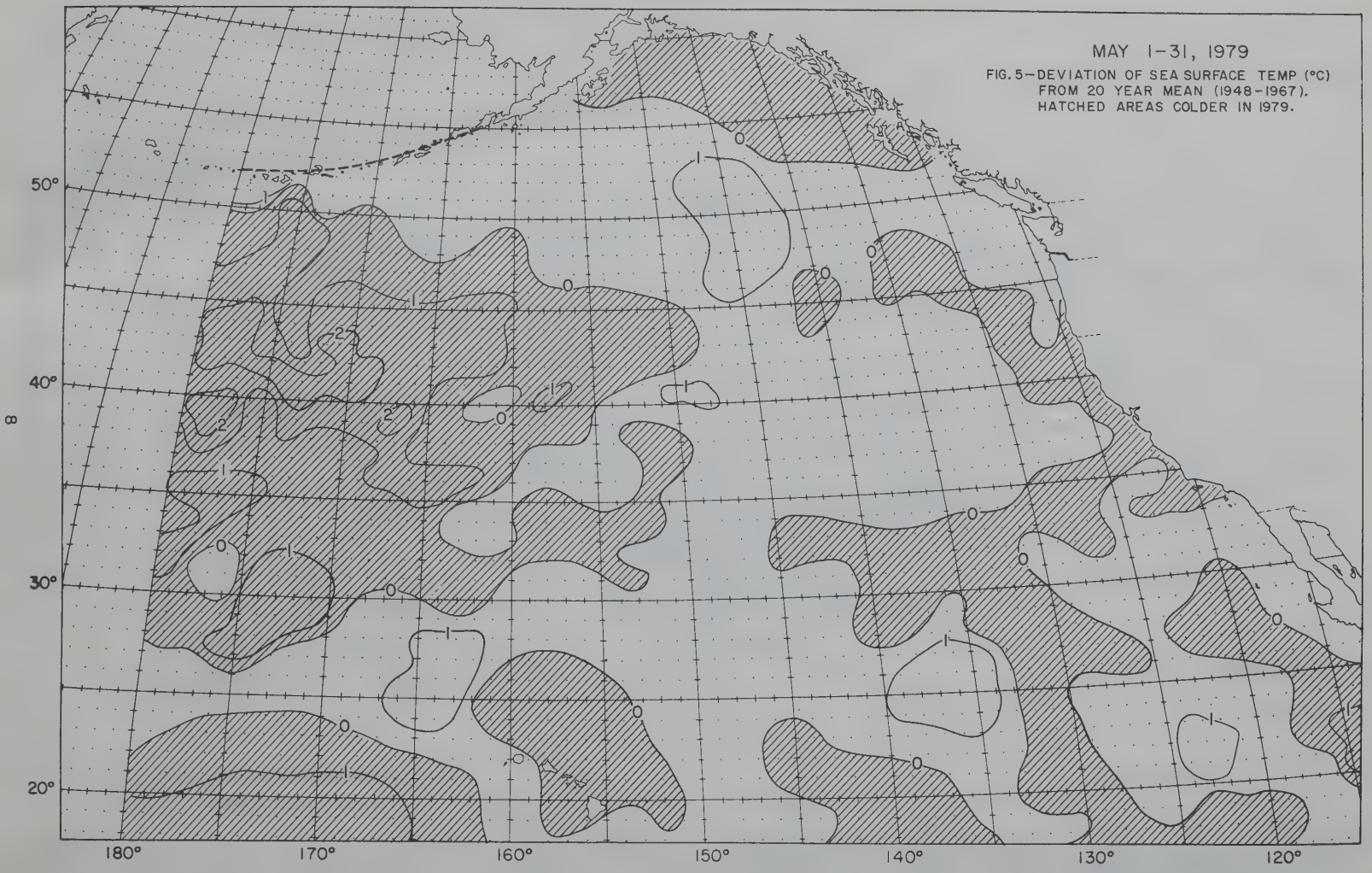


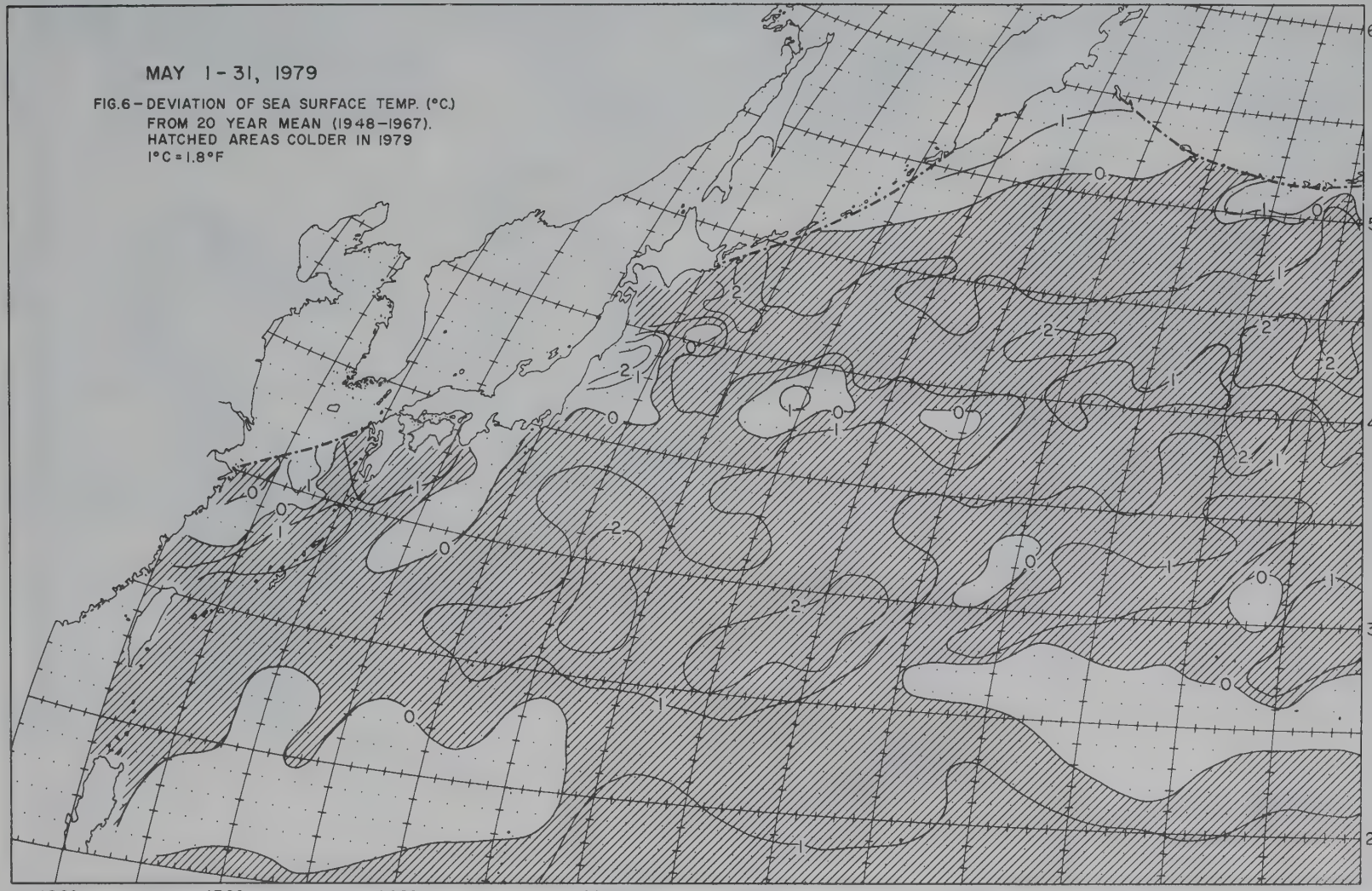

MAY 1961–1979
FIG. 1 — OBSERVED MEAN VALUES
-0000- BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1012
1016
1020
1024
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

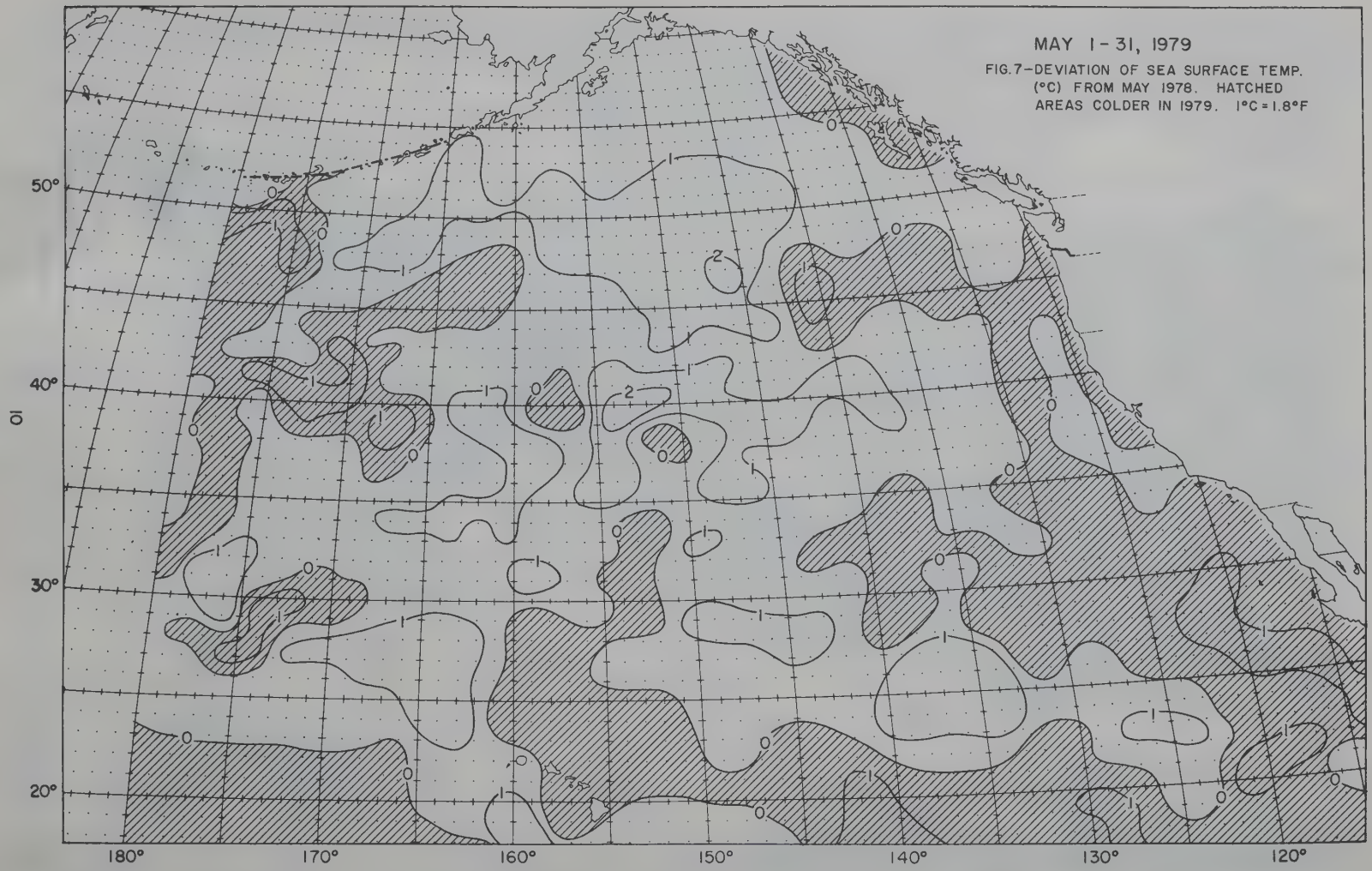

MAY 1979
FIG. 2 — OBSERVED VALUES
-0000- BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1004
1008
1012
1016
1020
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

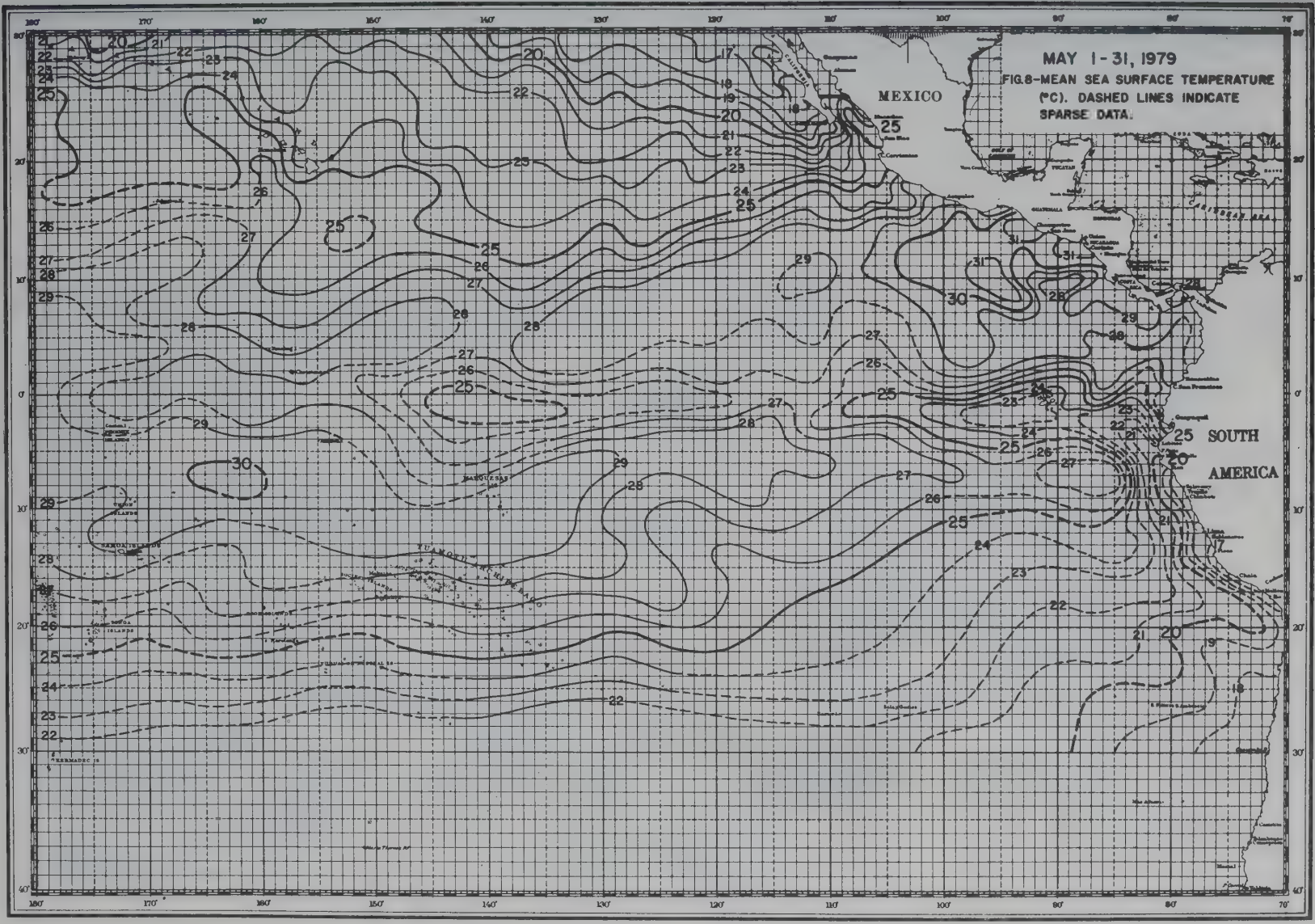

MAY 1-31, 1979
FIG. 3-MEAN SEA SURFACE TEMPERATURE (°C).
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
8.9
8.6
10.7
11.4
11.3
8.3
10.2
13.0
14.5
15.9


MAY 1-31, 1979
FIG 4-MEAN SEA SURFACE TEMPERATURE (°C)
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°

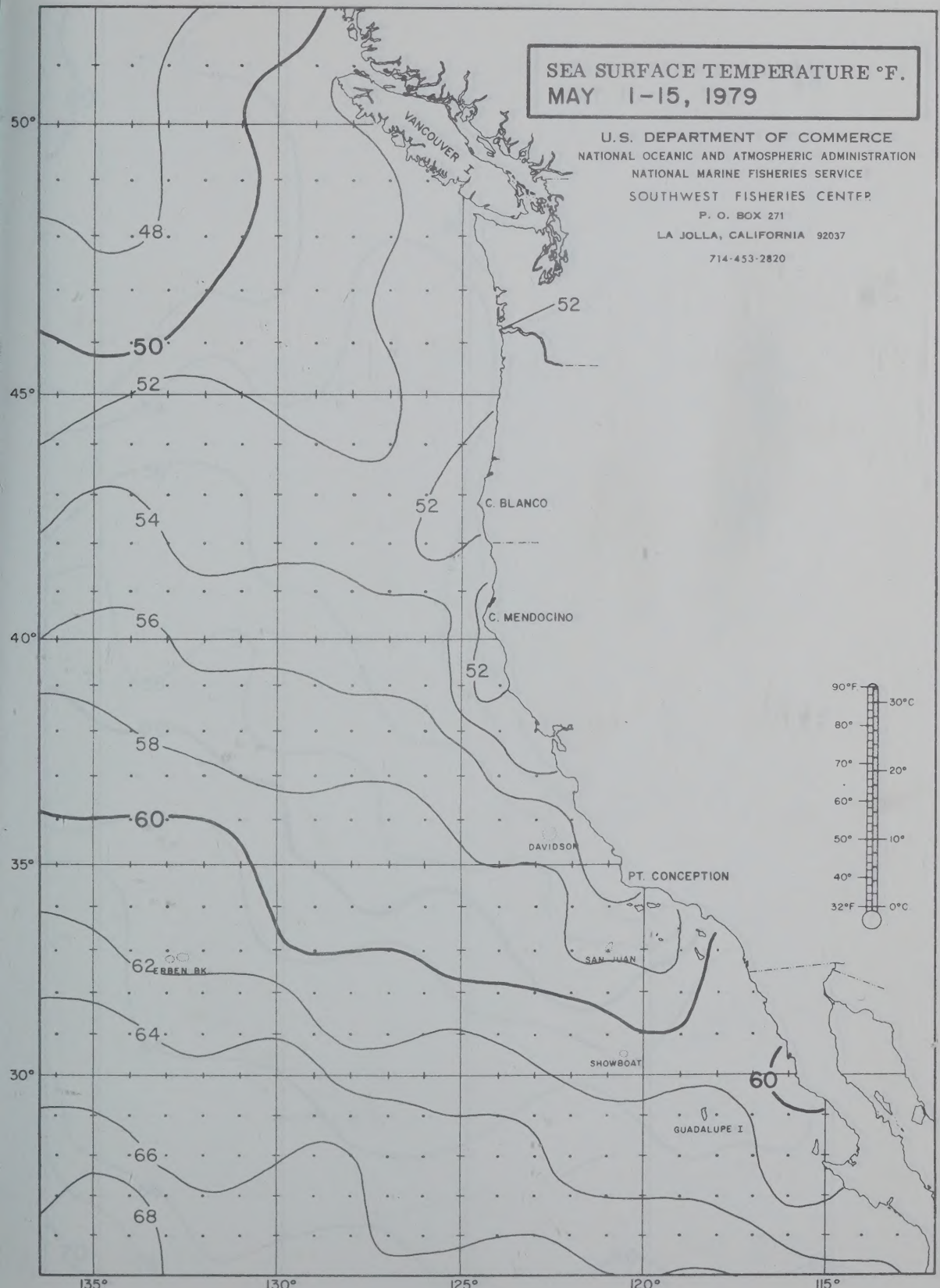

MAY 1-31, 1979
FIG. 5—DEVIATION OF SEA SURFACE TEMP (°C) FROM 20 YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1979.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


MAY 1 - 31, 1979
FIG.6 - DEVIATION OF SEA SURFACE TEMP. (°C.)
FROM 20 YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1979
1°C = 1.8°F
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


MAY 1 - 31, 1979
FIG.7—DEVIATION OF SEA SURFACE TEMP. (°C) FROM MAY 1978. HATCHED AREAS COLDER IN 1979. 1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


MAY 1 - 31, 1979
FIG.8-MEAN SEA SURFACE TEMPERATURE (°C). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA

FISHING INFORMATION – supplement



FISHING INFORMATION – supplement